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Predictors of Overall Performance in Physics Matric Advanced Level: An insight into entry requirements

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Abstract:

Predicting the future performance of a student based on the past performance is no easy task. Developing such a tool would enable Colleges and Universities as well as other institutions to spend their resources more wisely. This study is an attempt to use the Physics SEC result as a predictor for performance at Physics Matric Advanced level. Furthermore, five college-based assessment results taken during the students' two year course are also employed as predictors. The study shows that the number of females pursuing the study of Physics at Advanced level is rather low when compared to the males. More significantly, all the assessment tools examined are modest predictors of performance. The Physics SEC result does give a rough indication of Matric performance. However, achieving a bad grade at SEC level is not a barrier towards achieving a good result at Matric level. This means that making the Physics Matric course more stringent is not the way to making it better.

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Introduction

The main thrust behind this short study is to determine the best predictors of performance and success in Physics Advanced level, if there are any. This is very useful information to any educational institution because once a valid set of predictors is identified these may be employed for a variety of uses, depending on how sophisticated they are. First of all, predictors may be used to direct students in the choice of subjects that they undertake for their studies. They may be used to identify students who may have problems in making the grade early on such that remedial action may be taken. Good predictive criteria may also be used to point out the 'gifted' such that they may be provided with challenges to their learning. The analysis of students' performance over a period of time may also be a good performance indicator of the educational institution, in our case the Junior College. Finally, the main aim for such an analysis was driven by a belief that the present entry requirements at the Junior College are not providing proper guidance to the entrants in their choice of subjects.

1. Setting

At the end of secondary schooling students sit for external examinations that, apart from accrediting the students, provide access to post-secondary schooling. One of Malta's post-secondary academic institutions is the University Junior College. It was set up in 1995 and caters for those students aiming at tertiary education within the University itself (Junior College, 2000a).

At Secondary level, students have to make choices of curriculum subjects according to their abilities, skills and career orientation. They may seek vocational advice from their subject teachers and, particularly, from school guidance teachers (Education Division, 2000). As they start their fifth year, secondary students have to take decisions that are mostly related to the external examinations that they intend to sit for at the very end of their compulsory schooling. A variety of examination-related decisions have to be made, such as: which examinations are required to further their education; what special requirements are needed to follow particular post-secondary courses; which SEC (Secondary Education Certificate) examination differentiated paper, A or B, should be attempted (Pace, 2002b).

The entry requirements at the Junior College have ever since its inception been six passes in the Secondary Education Certificate (SEC) Examination at least at Grade 5 or equivalent (Junior College, 2000b). Around 90% of Junior College entrants present Physics as their Science requirement (Pace, 2002b). Junior College study course is based on two academic years during which the students follow 2 A Levels, 3 Intermediates and Systems of Knowledge (Junior College, 2000b).

In the context of mass higher education, the number of students opting to continue their post-secondary studies is always on the increase. The most challenging aspect of mass education is that the College had to remodel itself from one catering for the country's narrow top ability students to a more comprehensive one which accommodates students with differing abilities. This brings about additional problems especially as regards choice of subjects. While a 'gifted' student is generally able to deal with a wrong choice of subject and maybe redirect him/herself in good time, an average candidate may find that making a wrong choice leads inevitably to a complete failure in higher education. Proper guidance needs to be provided both at the feeder schools and during the critical phase of the summer months prior to entry at the Junior College so that the students may make well-informed choices and also during their first year if any change of subjects need to be made.

2. Aims

Casual observations of students' performance in successive year groups suggested that a good number of Physics students were not doing as well as one would desire. This trend is immediately uncovered by the low performance in informal tests that the Physics lecturers set their students and by the considerable proportion of first year students that have to sit for the Resit due to failure in obtaining a score of more than 45%, in the formal end-of-first-year test.

These insights, together with other research findings, have helped this study in clarifying the broad issue of performance in Physics Matric Level by addressing it through more specific research questions.

1. How valid is the Physics SEC examination as a predictor of performance in the Junior College Advanced Physics Course and in Matric (Advanced) examination?
2. How valid is the performance in both formal and informal assessments as a predictor of overall performance in Matric?
3. Are there any significant differences in performance related to gender and to the SEC differentiated paper?
4. In the light of the evidence from research questions 1 to 3, should the entry requirements for Physics A level course be more stringent?

3. Methodology and Sample

In order to seek answers for the research questions the College Physics data were coupled with the MATSEC (Matriculation and Secondary Examinations) data. The merging of the data and the relevant statistical analyses were carried out using SPSS. The sample consisted of the SEC 1999 and 2001 fresher students who finished their studies at the Junior College and sat for the 2000 and 2002 Advanced level Matric session respectively. This sample also included a number of students who had started the course in the year 1999 and 1998, and had repeated the first year. The sample of students who have completed their studies in 2000 will be referred to as the 2000 cohort; while those that completed their studies in 2002 will be referred to as the 2002 cohort. Various filters were used in SPSS to ensure that the data was compared on a like-with-like basis.

Table 1 shows that there are more boys than girls undertaking the papers and assessments in Physics. For the 2000 cohort the distribution by paper choice was not available, although informal analysis yielded a similar balance. The 2002 cohort distribution shows that there is a larger proportion of students who had chosen paper-

A rather than paper-B. The very low number of female, paper-B students must however stand out as they constitute only about 12% as opposed to the more than 20% of males.

Table 1. Matric Sample Distribution by gender and SEC paper choice

		Gender		Total
		Male	Female	
2000 Cohort SEC Paper 1998 *(sample by paper choice not available)*		96	63	159
2002 Cohort SEC Paper 1999	**A**	83	43	126
	B	21	6	27
	Total	104	49	153
Total		200	112	312

Besides using the MATSEC data for Matric and SEC, other Junior College internal data was used. The students' five assessment marks were entered in the data. These are divided into two: the first three Assessments take place in the First Year, while the last two are for the Second Year. These assessment exercises are all lecturer-based and no attempt at harmonisation is actually in place. The lecturers thus use various assessment tools such as homework, tests, projects and assignments. The data was also supplemented by the end-of-first-year test which is a very important test for the Junior College in that it influences the promotion of students to the Second Year.

There are many different analyses that have been carried out and are being presented here. All the assessment tools were correlated against each other to find out degrees of commonality using Pearson product-moment correlation index. The data was also analysed for gender and SEC paper choice differences using Independent Samples t-test and chi-square tests. Furthermore, the data was recoded into two new groupings, mainly SEC ability groups and Matric ability groups. For the SEC ability groups, the data was divided into the top ability (grades 1, 2 and 3) and the bottom ability (4 and 5) (sic). Similarly, the Matric ability group consisted of top ability (grades A, B and C) and bottom ability (D, E and F) candidates (sic). These groupings permit better contrasting of data such that differences in performance are sharpened and so conclusions assume higher validity. Each of the statistical tests used, as mentioned below, were set to test the null hypothesis at 2-tail significance so as to ensure a more rigorous statistic.

4. Results

In this part of the study the data analysed is presented systematically using tables and appropriate figures to outline the main findings. The data is organised into different groupings, namely according to the differentiated paper chosen at SEC level and by gender. Furthermore, ability groups have also been created to provide better contrast between high and low achievers; both for SEC grades as well as for Matric grades.

5.1 Relationship between Different Assessment and Performance Components

Table 2 shows that the assessments that students have been subjected to as from their SEC examination (1999, 2000) to their Matriculation in Physics (2000, 2002) do not show great similarity. Although all the scores, except one, show significant positive correlation amongst themselves, these differences are not so marked.

Table 2. Product-Moment Correlation Coefficients between Assessment Scores and Examination Grades for A level students

2000 Cohort Grades and Scores		SEC	1st Year Assessments			End of First Year Test	2nd Year Assessments	
			1	2	3		4	5
SEC		1.000						
1st Year Assmt	1	0.472	1.000					
	2	0.343	0.508	1.000				
	3	0.370	0.552	0.671	1.000			
	Test	0.540	0.459	0.404	0.564	1.000		
2nd Year Assmt	4	0.364	0.439	0.181*	0.443	0.544	1.000	
	5	0.420	0.436	0.413	0.555	0.606	0.583	1.000
Matric A level		0.488	0.443	0.378	0.497	0.708	0.545	0.630
2002 Cohort Grades and Scores		**SEC**	**1st Year Assessments**			**End of First Year Test**	**2nd Year Assessments**	
			1	**2**	**3**		**4**	**5**
SEC		1.000						
1st Year Assmt	1	0.416	1.000					
	2	0.244	0.627	1.000				
	3	0.151 NS	0.498	0.634	1.000			
	Test	0.422	0.315	0.348	0.299	1.000		
2nd Year Assmt	4	0.354	0.349	0.306	0.272	0.382	1.000	
	5	0.296	0.423	0.388	0.382	0.372	0.574	1.000
Matric A level		0.442	0.463	0.393	0.318	0.550	0.415	0.617

One *r-value* marked NS is not significant. Another one marked * is significant to the 0.05 level. All other *r-values* are significant at the 0.01 level

In general, the correlation values, albeit significant, are all rather low values. Few of these assessment tools correlate well with each other. The SEC exam correlates more with other summative-type assessments namely the Matric and the End of First Year test than it does with any of the five informal and formative assessments.

The end-of-first-year test shows an incredible metamorphosis. While in the 2000 cohort it correlates rather positively with all the other assessments, in the 2002 cohort it correlates appreciably well only with SEC and Matric A level but rather poorly with the other assessment exercises. This is largely due to a change in the system used for test construction. While in the latter only one person was responsible for the test construction, in the former the group effort used yielded a better paper.

The other assessment tools seem more or less to correlate well with each other. Although there are some peculiar differences, in that the First Year Assessments correlate very well between themselves and not so much with the 2nd Year Assessments. On the other hand the 2nd Year assessments compare well and are generally a good predictor of the Matric result, especially Assessment 5, the last one.

5.2 Gender issues

The most striking difference between the students is and remains the heavy deficit of girls choosing to study Physics at Advanced level, where they are outnumbered by a ratio higher than 2:1. On the other hand, there are very little differences between male and female students throughout the two years of study.

A look at the t-values in Table 3 reveals that there are little to no gender differences within this group of students. Pearson Chi-square values for SEC and Matric grades computed by gender also confirm this. The only significant difference that emerges is in 2002 Cohort Assessment 4 of the 2nd Year, and this may be attributable to a number of contingencies such as gender bias. The absence of a trend in gender differences is also confirmed by the fact that in the various assessments, males and females take turns at being the better gender. Another thing that is worthy of noticing is that there are very few differences in the distribution of students' scores. Generally speaking, females tend to demonstrate more homogeneous ability than males. However, except for Assessment 5 of both cohorts, all the values of standard deviation are very similar to each other. This may be an indication that students are at different stages of preparation for their 'real' assessment, i.e. the Matric.

Table 3. Means, Standard Deviation and t-test values by Gender

Grades and Scores		2000 Cohort			2002 Cohort		
		Males	Females	Ind. Samples t-test	Males	Females	Ind. Samples t-test
		N Mean S.D.	N Mean S.D.	NS = Not Significant	N Mean S.D.	N Mean S.D.	NS = Not Significant * = p < 0.05 level
SEC		96 3.01 0.96	63 3.17 1.06	0.995NS	103 3.05 1.19	49 3.12 1.07	0.369NS
1st Year Assessment	1	78 65.06 12.83	60 63.17 12.89	0.305NS	120 64.50 14.10	53 65.28 15.46	-0.322NS
1st Year Assessment	2	78 60.77 16.79	60 61.50 16.06	0.859NS	120 64.21 16.04	53 63.30 16.20	0.342NS
1st Year Assessment	3	78 58.21 17.15	60 56.83 18.80	-0.260NS	120 66.25 18.16	53 65.19 17.04	0.361NS
1st Year Assessment	Test	78 42.13 11.21	60 42.50 9.88	0.441NS	120 38.71 7.86	53 37.17 7.53	1.201NS
2nd Year Assessment	4	91 52.64 15.62	70 53.79 14.85	-0.207NS	120 51.13 13.62	53 55.47 12.49	-1.984*
2nd Year Assessment	5	91 45.77 21.74	70 47.57 20.83	-0.475NS	120 53.25 18.43	53 57.36 12.69	-1.474NS
Matric A level		111 3.85 1.52	70 3.91 1.40	-0.534NS	118 3.03 1.20	52 3.35 1.17	1.617NS

5.3 Paper choice in Physics SEC for the 2002 Cohort

The results here do not stray far from predictions such that students that had chosen paper A at SEC level outperform those that had chosen Paper B. Naturally the highest differences are present in the SEC grades as the paper choice is in itself barring students from obtaining certain grades. However, it is interesting to notice that this difference is also similarly evident as regards the Matric grades. From Table 4, the standard deviations respect the frequency of the groups, i.e. they are higher for the most numerous and vice versa. The last two assessments in the First Year show very little discrimination between these two groups of students, so much so that in Assessment 3 of the First Year paper B students obtain a higher mean score than paper A. However, this may be interpreted in a number of ways. It may mean that paper B students are better in the topics covered at the end of the First Year, but it is more likely a distortion introduced by ineffective and incoherent assessment tools.

Table 4. Means, Standard Deviation and t-test values by SEC paper Choice for 2002 Cohort

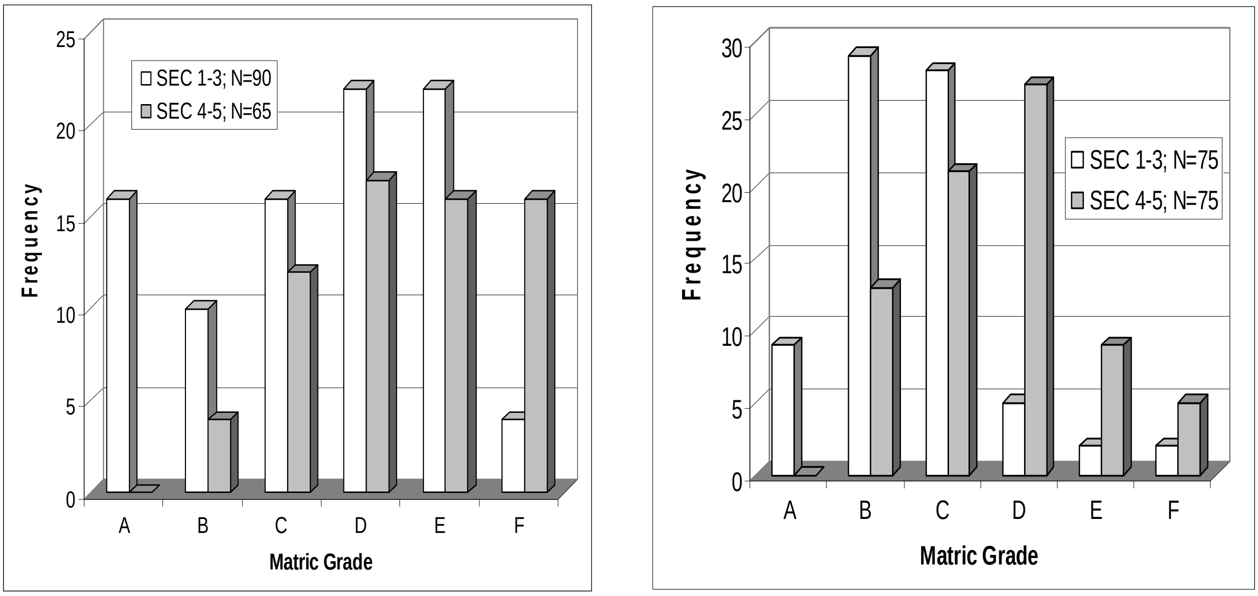
2002 Cohort Grades and Scores		SEC Paper A N Mean S.D.	SEC Paper B N Mean S.D.	Independent Samples t-test NS = Not Significant ** = p < 0.01 level *** = p < 0.001 level
SEC		125 2.83 1.12	27 4.19 0.40	10.754***
1st Year Assessment	1	126 67.58 14.00	27 58.52 12.85	3.272**
	2	126 65.56 16.21	27 61.30 15.85	1.262NS
	3	126 67.06 18.47	27 67.22 17.23	-0.043NS
	Test	126 39.54 7.72	27 34.67 6.71	3.329**
2nd Year Assessment	4	126 53.37 13.52	27 46.11 9.34	3.357**
	5	126 57.06 15.79	27 45.56 17.56	3.144**
Matric A level		124 2.90 1.09	27 4.00 1.27	4.162***

5.4 SEC Ability groups

Organizing students according to paper choice can provide an idea of whether the SEC can be an effective predictor of performance in Matric. This possibility becomes more evident when one divides the students into two groups according to their SEC grades. The two groups that have been formed are more or less of the same size, composed of about 75 students each. The first group consists of those students that obtained grades 1 to 3 in SEC while the second group is made up of grades 4 and 5. The distribution of grades shows that students that had obtained a grade 1 to 3 in their

SEC manage to do better than those that have obtained the lower grades. However, it is also clear from Figure 1 that having obtained a low grade at SEC level is not an impediment to continuing further studies in Physics. In some cases the low grade in SEC has been transformed into a grade B at Advanced level.

Figure 1 Distribution of Students' Matric Grades by SEC Ability group



2000 Cohort   2002 Cohort

Table 5 confirms the trends that emerged from Figure 1. The students who had obtained top grades at SEC level significantly surpass those from the lower grades in virtually all the assessment exercises carried out in these two years. It is only in Assessment 3 of the First Year that the difference between the two fades into insignificance. However, although the difference is conspicuous and consistent it does not mean that those students with a low SEC grade are failing at Advanced level. In virtually all assessments they still get a good score and in the Advanced level they obtain a mean grade of between C and D (3.63) which is still a useful grade to continue further education and also to seek employment.

Table 5. Means, Standard Deviation and t-test values by SEC Ability group

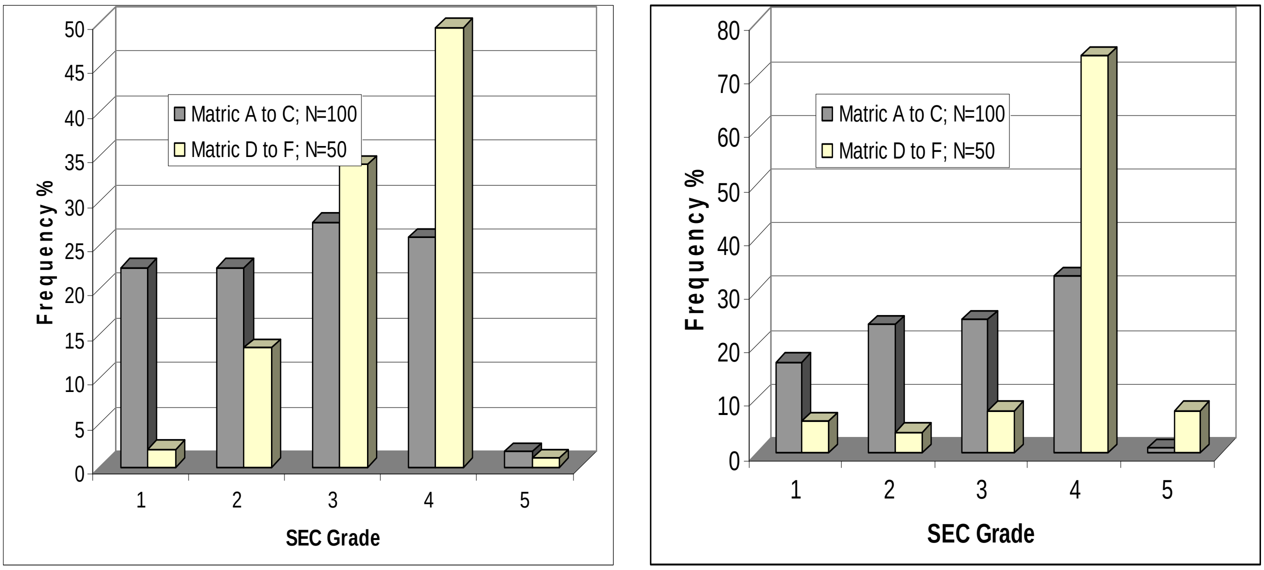
Grades and Scores		SEC Grades 1 to 3 (N / Mean / S.D.)	SEC Grades 4 and 5 (N / Mean / S.D.)	Independent Samples t-test (NS = Not Significant; ** = p < 0.01 level; *** = p < 0.001 level)
SEC		77 2.10 0.80	75 4.07 0.25	20.195***
1st Year Assessment	1	77 71.36 12.61	75 60.20 13.47	5.277***
	2	77 68.18 16.46	75 61.13 15.19	2.741**
	3	77 69.48 18.93	75 64.40 17.18	1.731 NS
	Test	77 40.91 7.79	75 36.20 6.86	3.951***
2nd Year Assessment	4	77 56.56 13.28	75 47.47 11.46	4.513***
	5	77 60.13 15.69	75 49.87 16.19	3.969***
Matric A level		75 2.57 1.05	75 3.63 1.11	5.951***

5.5 Matric Ability Groups

The Matric result was used to organize the students into two ability groups, one for the students who obtained the top grades A, B and C and one for the lower grades D, E and F.

Figure 2 shows that students who have obtained the higher grades had also obtained top grades in Physics at SEC level. On the other hand, the vast majority of students, 74% of 2002 cohort, from the lower Matric ability groups had previously obtained a grade 4. The remaining quarter of the students are more or less equally spread over the other four SEC grades. A similar distribution occurs for the top ability group but without there being the distinct peak over a particular grade. The percentage of students increases on going from grade 1 to grade 4, although this may be attributed to the lower grades being more numerous in general.

Figure 2 Distribution of Students' SEC Grades by Matric Ability group



2000 Cohort 2002 Cohort

Further consolidation of this is shown in Table 6 that highlights the differences between the Matric ability groups throughout the two years of study. All the differences are significant, mostly at the 0.001 level. It seems that students that end up with a low grade in Matric had started off by obtaining a lower grade in SEC and then continuing to get lower scores throughout their two years of study. However, in spite of there being this overall trend it does not force the lower ability students sufficiently down the scale such that they may be considered as having failed their post secondary education. Learning takes place amongst low achievers too! (sic) The most consistent predictor of performance seems to be the End of First Year test especially for the 2000 Cohort, with Assessment 5 coming in as close second. These general trends are confirmed in both cohorts.

Table 6. Means, Standard Deviation and t-test values by Matric Ability group

Grades and Scores		2000 Cohort: Matric Grades A to C (N, Mean, S.D.)	2000 Cohort: Matric Grades D and F (N, Mean, S.D.)	2000 Cohort: Ind. Samples t-test (** = p < 0.01, *** = p < 0.001)	2002 Cohort: Matric Grades A to C (N, Mean, S.D.)	2002 Cohort: Matric Grades D and F (N, Mean, S.D.)	2002 Cohort: Ind. Samples t-test (** = p < 0.01, *** = p < 0.001)
SEC		58 2.62 1.15	97 3.34 0.80	4.188***	100 2.77 1.12	50 3.74 0.90	5.729***
1st Year Assessment	1	56 69.91 12.77	75 60.47 11.42	4.378***	111 68.78 13.55	59 57.29 13.56	5.262***
1st Year Assessment	2	56 67.05 15.19	75 57.07 16.01	3.492**	111 67.34 14.30	59 57.97 17.37	3.555**
1st Year Assessment	3	56 66.34 15.45	75 52.20 16.57	5.024***	111 69.59 16.71	59 60.34 17.76	3.301**
1st Year Assessment	Test	56 49.70 9.32	75 37.13 8.20	8.031***	111 40.68 7.47	59 33.59 6.07	6.682***
2nd Year Assessment	4	63 61.43 12.59	81 47.47 12.87	6.537***	111 55.68 13.92	59 46.78 10.33	4.718***
2nd Year Assessment	5	63 59.42 18.08	81 40.00 15.97	6.898***	111 60.36 15.74	59 43.81 13.59	7.146***
Matric A level		67 2.25 0.82	110 4.81 0.77	20.508***	111 2.41 0.65	59 4.47 0.73	18.286***

As a summary, one can compare the Matric Ability group with the SEC ability group. The distribution of values in Table 7 demonstrates how obtaining a good grade in Physics at SEC level is a good start towards obtaining a good grade at Matric level. However, getting this good grade is only a rough indicator as there are an appreciable number of students (50) with low SEC grades (4-5) who manage to get a top grade in Matric A level. Also, a good number of students (54) with a high SEC grade (1-3) do not keep up their good performance at Advanced level. Besides these general trends, there is also an evident difference in the performance between the two cohorts. Presumably hard work in studying pays more than a good starting grade!

Table 7. Matric Ability group compared to SEC Ability group

SEC Ability Group		Matric Ability Group		
		High	Low	Total
2000 Cohort	High	42	48	90
	Low	16	49	65
	Total	58	97	155
2002 Cohort	High	66	6	72
	Low	34	41	75
	Total	100	50	147
Combined	High	108	54	162
	Low	50	90	140
	Total	158	147	355

5. Conclusions and Recommendations

There are fewer females than males pursuing the Physics Advanced course at the Junior College. From 2000 to the 2002 there is a pejorative progress; the male to female ratio falls from 1.5 in 2000 to 2 in 2002. Furthermore it appears that an even less proportion attempt the Matric Physics Advanced nationally. In 2002 the ratio of 2.5:1 was calculated using the relative frequencies for the entire Maltese Physics Advanced cohort (from frequency data MATSEC 2002 Matriculation Statistical Report). This may indicate that the Physics Advanced College course attracts more females to pursue studies in the physical sciences than the other post-secondary colleges although still more needs to be done as regards the gender gap. This is in sharp contrast with the fact that more females than males sat for the SEC 2000. Furthermore, in a previous study, it had been found that there are no significant gender differences in performance in the Physics SEC 2000 and only slightly better grades obtained by females (Pace, 2002b). This study also shows that that there are more females than males opting for the SEC Paper B (ibid.) In the short space of two years, the similar ability demonstrated at SEC level between the two genders is replaced by a male superiority in numbers and in results.

This evidence derived from the two Physics examinations indicates the loss of a good proportion of females continuing further studies and subsequent professional careers in the physical sciences or related. This could also mean that the Physics Advanced course does not have a sufficient intake of the Physics SEC high ability students. Further indication of the lack of females pursuing higher education in Physics is the low standard deviations both in the SEC and Matric examinations shown in this study. These indicate that these females are a narrow range of high achieving students and that the average ability female students for some reason or other are opting out of continuing Physics at Advanced level.

Identifying valid predictors for Matric Advanced level grades is never straight forward. For one thing, not one of the summative or formative assessments employed from SEC to the Junior College internal tests and scores correlates that strongly with the Matric Advanced level results. Therefore, obtaining a top SEC grade or doing well in the Junior College Assessments is not a sure recipe for success at Matric level. However, the correlation values (Table 2) between SEC and Matric are still indicative that these students may be already on the right track from the start. This correlation coefficient, although rather low, is not unimportant as it is a measure between two examinations that are essentially different in format and skills tested, concepts learned and medium used, not to mention difficulty level. One important difference between the two examinations is the Practical component which is formally examined at Matric Advanced level while at SEC level it is measured using school based continuous assessment. Furthermore, the mathematical/analytical content is drastically increased at Matric level as is the level of English employed. The format of the paper also changes and the students are given a lot more choice at Advanced level when one compares it to SEC which offers no choice of questions at all. In a similar study to this one, Ventura (2001) calculated an r-value of 0.572 for SEC 1998 and Matric 2000 cohort that is higher than the ones obtained here but still indicative that the two Physics external examinations are essentially different.

This low predictive validity of the SEC grades, or any other assessment tool considered for that matter, also suggests that with hard work and commitment at the Junior College, a student that starts off with a low SEC grade stands a 50% chance of obtaining a good grade in Matric Advanced level. If not a good grade, but a useful grade to continue further education is certainly within their reach and so even a low paper-B SEC grade 5, is still within the margins of success for a useful Matric result. This should be of credit to the Physics tuition at the College apart from the efforts done by the student. In the light of this study it would definitely not be advisable if the Physics course entry requirements were made more stringent. As argued in Section 5.5 above, (Table 7) restricting entrance to Physics Advanced to those who obtain grades 1-3 in Physics SEC, implies rejecting about a third of the cohort who attain low SEC grades (4-5) but succeed in getting the higher grades A-C in the Advanced while at the same time keeping another third of those that achieve 1-3 in SEC but who only manage to obtain grades D and E in Advanced level. If assessment is more attuned to diagnose student difficulties and assess their potential, then a programme can be implemented whereby students may be guided better to achieve optimum results.

This area certainly requires further study. A cursory analysis of drop outs from first year to second year in 2002 reveals that about 90% of them had indeed chosen Paper B for their SEC examination. Therefore, this may mean that only paper-B SEC students with a characteristic resilience manage to make it through the two years of study, to eventually have a chance at the Advanced level. The success of the paper-B students may thus be attributed to the weeding out of the really weak ones during the first year and the consolidation of the resilient types. However, it may also mean that students who are dropping out of Physics Advanced level course are not receiving the proper support. This fact calls for a lower student-lecturer ratio during lectures that presently stands at around 50:1 and certainly, and more importantly, a lower ratio during tutorials presently at about 25:1. The numbers are far too big to successfully identify and direct students as is merited. The situation does indeed improve during second year when the effect of the drop outs, harmful as it may be to them, is beneficial to the ones that remain. Student-to-lecturer ratio falls slightly, the assessment tools become much more effective and the quality of the learning increases.

A very important indicator of performance was the end-of-first-year test for the 2000 cohort which contrasts highly with the one for 2002. This difference seems rather peculiar when one considers that the results of this study show such comparability between the two cohorts. However, there are significant differences between the two end-of-first-year tests. The method of construction of the test has changed from the first to the second instance. For the 2000 cohort, the test was similar in format to the Matric in that it consisted of two written papers and a practical component. This was constructed by means of a group effort of all the lecturers at the Physics Department. On the other hand, the 2002 cohort were tested by a single written paper and practical constructed solely by the Physics Subject Coordinator and reviewed by two lecturers. These two differences alone may account for the discrepancy in correlation between the End of First Year test and the Matric for the respective cohorts.

This study puts into emphasis that the informal assessments throughout the Junior College Physics Advanced course have a more formative function and so they may be used to diagnose those students that are falling behind. As students progress in their two year course, so does the efficiency of these assessments in predicting success or failure in Physics Matric A level with the notable exception of the End of First Year test in the 2000 cohort. This culminates in Assessment 5, just before students sit for their Matric that shows the greatest degree of commonality out of all the assessment tools analysed with the Matric Advanced level result. This suggests that by this time students have gathered a certain momentum in their studies, having mastered concepts, practised skills and gained insights. Although the rather high standard deviations indicate that some students are still not at the top of their preparation. Assessment 5 should be considered by students as an indication of whether they are on the right track or whether they need to work harder still. However, what the argument outlined in the previous paragraph shows is that perhaps a mock test would give more valid feedback to the students. Thus, they would be able to bridge the gap between the fuzzy knowledge that they obtain with the present system to a coherent account of strengths and weaknesses ensuing from an examination.

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